

## DESCRIPTIVE MODEL OF OLYMPIC DAM Cu-U-Au

By Dennis P. Cox

DESCRIPTION Hematite, bornite, and other minerals in sedimentary breccia filling grabens in granitic basement.

GENERAL REFERENCE Roberts and Hudson (1983).

### GEOLOGICAL ENVIRONMENT

Rock Types Proterozoic alkali granite with red K-feldspar, brecciated and forming clasts in matrix-rich breccia. Felsic volcanic breccia and tuff. Hematite iron-formation.

Textures Granophyric intergrowth in granite. Breccias grade from clast-supported in interior of basin to matrix-supported in central iron-rich part.

Age Range The only example is 1,500 my. old.

Depositional Environment Proterozoic granite basement broken by a deep, narrow graben filled by rapidly deposited breccia, iron-formation, and minor felsic volcanic rocks.

Tectonic Setting(s) Narrow graben transcurrent to broad arch. Local gravity high caused by dense iron-formation. Trace of graben can be detected in post-ore cover rocks as photo lineaments.

Associated Deposit Types Sediment-hosted copper deposits, iron-formation.

### DEPOSIT DESCRIPTION

Mineralogy Stratabound hematite + bornite + chalcopyrite; transgressive hematite + chalcocite + bornite with fluorite, barite, and minor carrollite, cobaltite, native silver, coffinite, brannerite, bastnaesite, and florencite.

Texture/Structure Ore minerals in breccia matrix and in veins. Pisolitic siderite-fluorite-chlorite in stratabound ore.

Alteration Hematite-chlorite and sericite-quartz, also carbonates, fluorite, barite, rutile, and rare anhydrite, tourmaline, and magnetite. Intense chlorite alteration of granite below ore bodies. K-feldspar replaced by chlorite.

Ore Controls Stratiform ore in matrix polymictic-breccia containing clasts of granite, pisolitic rock, hematite, and sulfides. Transgressive ore in fractures parallel to long axis of graben.

Weathering Type example not exposed.

Geochemical and Geophysical Signature Cu+U+Co +Au+Ag+light REE+F+Ba. Dispersion pattern not known. Cu associated with hematite. Co associated with lower pyrite-rich zone. U-REE associated with Cu but Cu not always with U-REE. Au highest in late chalcocite ore. Pb, Zn very low.

Radioactivity would be detectable if exposed or shallow. Magnetic high of unknown origin.

### EXAMPLES

Olympic Dam, AUSA (Roberts and Hudson, 1983)